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Memo

date: *May 5, 2008*

to: *RSC*

from: *D. Beavis*

subject: *EBIS Penetration Protection Change*

Recently a fault study (CA-221) was conducted with 10.4 MeV proton beam in the LTB beam line. The goal was to measure if any radiation was detectable outside the EBIS-Booster penetration in the Linac building if low energy proton beam faulted in LTB near the penetration. The fault study used an intensity of $1.25*10^{11}$p/s. The fault study used a gate valve downstream of the penetration and also used the main bending magnet and a local dipole to attempt to strike a target near the beam pipe. In all cases no detectable radiation was measured.

A fault study with 200 MeV protons was conducted last year and the results presented to the committee (see minutes[1] of March 20, 2007). No detectable radiation was seen. As discussed in the minutes the large bend cannot create a beam fault in this area (analysis provided[2] by D. Raparia). The inability to deflect a beam into a target is the principle reason the dose rates are so small at the exit of the penetration. At that time there was concern that at lower energies the beam could be deflected by DH076. D. Raparia has provided details[3] of the DH076 and shown that even at 10 MeV it cannot deflect the protons into the beam pipe at the location of the penetration.

Changes to configuration:

1) It is concluded that the energy restriction of the LtB can be removed.
2) It is concluded that the shielding wall in the linac area can be removed.

However, it is preferred that the interlocking chipmunk remain at the port until more operating experience is achieved.

A check-off list item will be added for the Linac Liaison Physicist to state that no optics changes have been made to the LtB that could affect this analysis. **(CK-Booster-fy2009-531)**

References:

1) Minutes of RSC March 20, 2007
2) D. Raparia, " Fault Studies for the LtB-EtB Rgeion", March 15, 2007
3) D. Raparia, Note the deflection of DH076 to the beam pipe.

cc: D. Barton, H. Kahnhauser, S. LaMontagne, V. Litvinenko, D. Lowenstein, P. Pile, T. Roser, J. Tuozzolo